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CLAIMS

[Claim(s)]

[Claim 1]In an image forming device characterized by comprising the following, said inverting means and said ejecting means, An image forming device provided with a double-sided printing mechanism establishing independently a carrying path which carries out nip of said web material, respectively, and consists of roller groups of a lot which can be conveyed, and leads said web material to said inverting means and said ejecting means, respectively.

An image formation part which forms a picture in a web material as a recording medium.

An inverting means which reverses a transportation direction in order to convey again a web material conveyed from said image formation part in said image formation part.

An ejecting means which discharges said web material conveyed from said image formation part.

[Claim 2]An image forming device provided with the double-sided printing mechanism according to claim 1 considering it as a roller of 3 stage arrangement which forms two nips of reversal of said web material and discharge of said roller group which constitutes said inverting means and said ejecting means.

[Claim 3]An image forming device provided with the double-sided printing mechanism according to claim 1 or 2 provided with a drive system which operates two or more rollers of said roller group with single drive mechanism by a mutual drive and follower relations.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the image forming device which is applied to image forming devices, such as a printer, a copying machine, and a facsimile, especially has a double-sided printing mechanism.

[0002]

[Description of the Prior Art]In image forming devices, such as a printer, a copying machine, a facsimile, improvement in the speed of double-sided printing is progressing to web materials, such as a print form. It says that it turns this over and prints another one side after double-sided printing prints one side of a web material, and, generally the switch back call is used.

[0003]With a switch back call, the web material which one side was printed and has been conveyed, It sends into the switchback carrying path which comprises a switch back roller once, and counterrotation of the switch back roller is carried out after that, and it lets out a web material, and conveys to the printing unit again via another carrying path. By this, a web material will turn over and will be printed in the printing unit.

[0004]Under switch back operation enables it to discharge another web material in a large-sized copying machine by forming independently the switch back roller which carries out the discharge roller which discharges a printed web material on the tray of the device exterior, etc., and switch back operation, and driving these rollers independently. Continuous carrying of the web material can be carried out by this, and high-speed double-sided printing becomes possible.

[0005]

[Problem(s) to be Solved by the Invention]However, if it has a discharge roller and a switch back roller, the sequence space of two rollers will be needed, and also the mechanism for a drive of these will also be added. For this reason, although it is desirable to improvement in the speed by continuation delivery of a web material, there is a limit in the miniaturization of a device.

[0006]On the other hand, it is one effective means to make a discharge roller and a switch back roller serve a double purpose in the case where priority is given to a miniaturization. That is, the miniaturization of a device will be attained if discharge of a web material [finishing / double-sided printing] and switch back operation for reversal of the web material one side printed are considered as the composition which a

discharge roller is made to bear.

[0007]However, in the period of the operation which switchbacks, the following web material is not continuously sendable what uses one roller also [of a web material / discharge and reversal] in this way. For this reason, the conveyance interval equivalent to one sheet of a web material is vacant, and printing speed is reduced.

[0008]Thus, conventionally, with composition, since it is necessary to form a switch back roller independently if it is going to accelerate double-sided printing speed, while the whole device is enlarged, if it is going to give priority to a miniaturization, printing speed will fall.

[0009]There is the issue which should be solved in this invention in providing the image forming device provided with the double-sided printing mechanism in which improvement in the speed and a miniaturization can be simultaneously realized by enabling both reversal of a web material, and discharge simultaneously with a single mechanism.

[0010]

[Means for Solving the Problem]An image formation part which forms a picture in a web material as a recording medium.

An inverting means which reverses a transportation direction in order to convey again a web material conveyed from said image formation part in said image formation part.

An ejecting means which discharges said web material conveyed from said image formation part.

A carrying path which is the image forming device provided with the above, carries out nip of said web material, respectively, and constitutes said inverting means and said ejecting means from a roller group of a lot which can be conveyed, and leads said web material to said inverting means and said ejecting means was established independently, respectively.

[0011]Since reversal and discharge of a web material can be operated by a roller group of a lot according to this composition, an image forming device provided with a double-sided printing mechanism which realized improvement in the speed and a miniaturization simultaneously is obtained.

[0012]

[Embodiment of the Invention]The image formation part by which the invention according to claim 1 forms a picture in the web material as a recording medium, In the image forming device which has an inverting means which reverses a transportation direction in order to convey again the web material conveyed from said image formation part in said image formation part, and an ejecting means which discharges said web material conveyed from said image formation part, Carry out nip of said web material, respectively, and said inverting means and said ejecting means are constituted from a roller group of the lot which can be conveyed, And even if it is characterized by establishing independently the carrying path which draws said web material, respectively and does not equip said inverting means and said ejecting means with each mechanism the object for discharge, and for reversal, it has the operation that the inversion operation and discharging operation of a web material can be performed simultaneously.

[0013]The invention according to claim 2 said roller group which constitutes said inverting means and said ejecting means, It is the image forming device provided with the double-sided printing mechanism according to claim 1 considering it as reversal of said web material, and the roller of 3 stage arrangement which forms

two nips of discharge, Reversal of a web material and delivery for discharge can be made to bear in the combination of the roller of a minimum number, and it has the operation that device capacity can be made still smaller.

[0014]It is the image forming device provided with the double-sided printing mechanism according to claim 1 or 2, wherein the invention according to claim 3 is provided with the drive system which operates two or more rollers of said roller group with single drive mechanism by a mutual drive and follower relations, It has the operation of urging further the miniaturization of the device capacity by the roller group for drive mechanism, reversal, and discharge.

[0015]Hereafter, an embodiment of the invention is described using drawing 12 from drawing 1. Drawing 1 is an entire configuration figure of the image forming device provided with the double-sided printing mechanism in an embodiment of the invention.

[0016]An image forming device arranges four image formation station ("process unit" is called hereafter) Pa, Pb, Pc, and Pd as a main element. These process unit Pa-Pd forms the color picture of black, cyanogen, magenta, and yellow, respectively, and is provided with the photo conductor drums 1a, 1b, 1c, and 1d as image support. The electrifying means 2a of exclusive use [surroundings / of the photo conductor drums 1a-1d], 2b, 2c, 2d, The exposure means 3 for irradiating each photo conductor drums 1a-1d with the light according to picture information, the developing means 4a, 4b, 4c, and 4d, the transfer means 5a, 5b, 5c, and 5d, and the cleaning means 6a, 6b, 6c, and 6d are arranged, respectively. And to the photo conductor drums [1a-1d] down side, the endless intermediate transfer belt 7 which runs to the arrow direction in a figure and revolves each process unit Pa-Pd in order is arranged.

[0017]electrifying-means 2a In such composition, 1st process unit Pa reaches first, After forming the latent image of the black-components color of picture information on the photo conductor drum 1a by the exposure means 3, this latent image is visible-image-ized as a black toner image by the developing material which has black toner by the developing means 4a, and a black toner image is transferred by the intermediate transfer belt 7 by the transfer means 5a.

[0018]On the other hand, while the black toner image is transferred by the intermediate transfer belt 7, the latent image of a cyanogen ingredient color is formed by the 2nd process unit Pb, Then, the cyanogen toner image by a cyanogen toner is acquired by the developing means 4b, and a cyanogen toner image is transferred by the transfer means 5b of the 2nd process unit Pb by the intermediate transfer belt 7 which transfer ended by 1st previous process unit Pa, and is laid on top of it with a black toner image.

[0019]After image formation is hereafter performed in a similar way also about a magenta toner image and a yellow toner image and superposition of the toner image of four colors is completed to the intermediate transfer belt 7, Package transfer of the toner image of four colors is carried out by the transfer roller 11 on the web materials 9, such as paper supplied by the web-material feeding means 8 from the web-material supply tray 10, heat fixing is carried out by the fixing means 12, and a full color image is obtained on the web material 9. The web material to which it was fixed is discharged by the discharge inverting means 13 to the discharging tray 16.

[0020]Residual toner is removed by the cleaning means 6a-6d, and each photo conductor drum 1a-1d which transfer ended is prepared for the next image formation performed succeedingly.

[0021]When performing double-sided printing in this image forming device, the web material 9 switchbacks

by the discharge inverting means 13, and is conveyed to the printed [one side] web-material carrying path 15-2. Then, it is transferred by the transfer roller 11 as the 2nd transfer means to another field, is again established by the fixing means 12, and is discharged by the discharge inverting means 13 to the discharging tray 16.

[0022]Drawing 2 is a figure showing the conveyance usual route of the web material in an embodiment of the invention. First, the web material 9 is conveyed from the web-material supply tray 10 to the web-material carrying path 15-1, and is transferred to one side by the transfer roller 11 which constitutes the 2nd transfer means. And it switchbacks, after being conveyed to the inverting means which comprises the driving roller 13-1 and the switch back roller 13-2, and it is returned to the printed [one side] web-material carrying path 15-2. Then, the web material 9 is again conveyed in the state where it turned over to the web-material carrying path 15-1, similarly is transferred by the transfer roller 11 to another field, is conveyed to the ejecting means which comprises the driving roller 13-1 and the discharge roller 13-3, and is discharged to the discharging tray 16.

[0023]Drawing 3 is a perspective view of the switch-back-operation part in the state before switch back operation, and drawing 4 is the side view. Drawing 5 is a perspective view of the switch-back-operation part in the state where switch back operation and discharging operation are performed simultaneously, and drawing 6 is the side view. Drawing 7 is a figure showing the interlocking relationship between each roller, and the figure in which drawing 8 (a) shows the branching device in the state where the branching device turned to the direction of an ejecting means, and its driving means, and (b) are the figures showing the branching device in the state where the branching device turned to the direction of an inverting means, and its driving means.

[0024]In a figure, an inverting means comprises the driving roller 13-1 and the switch back roller 13-2, and an ejecting means comprises the driving roller 13-1 and the discharge roller 13-3. As shown in drawing 7, the driving roller 13-1, the switch back roller 13-2, and the discharge roller 13-3 are connected to gear 17-1, 17-2 and 17-3, respectively. If the gear 17-1 is driven by a driving means, in order that gear 17-2, 17-3 may follow, respectively, the switch back roller 13-2 and the discharge roller 13-3 will follow to the driving roller 13-1. In the state where the branching device 14 has the structure of changing direction by operating the solenoid 18, and the solenoid 18 is not operated as shown in drawing 8. As shown in the figure (a), a branching device turns to the direction of an ejecting means, and where the solenoid 18 is operated, as shown in the figure (b), a branching device turns to the direction of an inverting means.

[0025]First, the web material 9-1 conveyed from the web-material carrying path 15-1 printed [one side] is led to an inverting means like drawing 3 and drawing 4 by the branching device 14 which operated the solenoid 18 and was turned to the inverting means side. Before the web material 9-1 printed [one side] passes ejection and an inverting means thoroughly from the branching device 14, it halts and an inverting means and an ejecting means begin counterrotation.

[0026]Furthermore, in drawing 5 and drawing 6, simultaneously with the counterrotation start of an inverting means and an ejecting means, if operation of the solenoid 18 is stopped, the branching device 14 will serve as the posture in which it turns to the ejecting means side. The double-sided printing finishing web material 9-2 is conveyed from the web-material carrying path 15-1 there, and it is discharged by the ejecting means on the discharging tray 16. Simultaneously, the web material 9-1 printed [one side] is conveyed to the

printed [one side] web-material carrying path 15-2.

[0027]And if the double-sided printing finishing web material 9-2 slips out from an inverting means thoroughly from an ejecting means, respectively, the web material 9-1 printed [one side], An inverting means and an ejecting means begin positive rotation again, the solenoid 18 operates, it will be in the state of drawing 3 and drawing 4, and the web material 9-1 printed [one side] will serve as a flow conveyed to an inverting means.

[0028]Hereafter, it explains, using drawing 9 to drawing 12 as a flow of the whole web material. Drawing 9 to drawing 12 is a time sequence diagram in an embodiment of the invention.

[0029]First, it explains that web-material A flows. Web-material A of drawing 9 is inserted in the web-material carrying path 15-1 from the web-material supply tray 10. Next, it is turned to between the driving roller 13-1 and the switch back roller 13-2 by the branching device 14 like drawing 10, and enters like drawing 11 between the driving roller 13-1 and the switch back roller 13-2. Before passing through between the driving roller 13-1 and the switch back rollers 13-2 like drawing 12, the driving roller 13-1, the switch back roller 13-2, and the discharge roller 13-3 begin counterrotation. Simultaneously with it, the branching device 14 is turned to between the driving roller 13-1 and the discharge roller 13-3.

[0030]Next, web-material A is conveyed like web-material B among drawing 12 from drawing 9. Like drawing 9, after web-material B escapes from between the driving roller 13-1 and the switch back rollers 13-2 thoroughly, the branching device 14 is again turned to between the driving roller 13-1 and the switch back roller 13-2. Simultaneously with it, the driving roller 13-1 of drawing 10, the switch back roller 13-2, and the discharge roller 13-3 begin normal rotation. Furthermore, it is conveyed in order of B of drawing 11, and B of drawing 12, and will be in the state of C of drawing 9 the next. Here, it is turned to between the driving roller 13-1 and the discharge roller 13-3 by the branching device 14, and is discharged on the discharging tray 16 by the driving roller 13-1 and the discharge roller 13-3.

[0031]

[Effect of the Invention]According to this invention, even if it does not have each mechanism for exclusive use for reversal of a web material, and discharge, inversion operation and discharging operation can be operated by synchronization by the roller group which carries out nip of the web material. For this reason, continuous printing is possible, without completely vacating a conveyance interval among web materials in double-sided printing, and improvement in the speed becomes possible.

[0032]Since between each of these rollers can be constituted as a carrying path made into reversal and the nip part of discharge when the mechanism for reversal and taking out is made into three steps of roller groups, the miniaturization of a device is attained. And if it has composition which gives interlocking relationship among two or more rollers, and is driven with single drive mechanism, it will be urged to a miniaturization.

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TECHNICAL FIELD

[Field of the Invention]This invention relates to the image forming device which is applied to image forming devices, such as a printer, a copying machine, and a facsimile, especially has a double-sided printing mechanism.

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PRIOR ART

[Description of the Prior Art]In image forming devices, such as a printer, a copying machine, a facsimile, improvement in the speed of double-sided printing is progressing to web materials, such as a print form. It says that it turns this over and prints another one side after double-sided printing prints one side of a web material, and, generally the switch back call is used.

[0003]With a switch back call, the web material which one side was printed and has been conveyed, It sends into the switchback carrying path which comprises a switch back roller once, and counterrotation of the switch back roller is carried out after that, and it lets out a web material, and conveys to the printing unit again via another carrying path. By this, a web material will turn over and will be printed in the printing unit.

[0004]Under switch back operation enables it to discharge another web material in a large-sized copying machine by forming independently the switch back roller which carries out the discharge roller which discharges a printed web material on the tray of the device exterior, etc., and switch back operation, and driving these rollers independently. Continuous carrying of the web material can be carried out by this, and high-speed double-sided printing becomes possible.

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EFFECT OF THE INVENTION

[Effect of the Invention]According to this invention, even if it does not have each mechanism for exclusive use for reversal of a web material, and discharge, inversion operation and discharging operation can be operated by synchronization by the roller group which carries out nip of the web material. For this reason, continuous printing is possible, without completely vacating a conveyance interval among web materials in double-sided printing, and improvement in the speed becomes possible.

[0032]Since between each of these rollers can be constituted as a carrying path made into reversal and the nip part of discharge when the mechanism for reversal and taking out is made into three steps of roller groups, the miniaturization of a device is attained. And if it has composition which gives interlocking relationship among two or more rollers, and is driven with single drive mechanism, it will be urged to a miniaturization.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, if it has a discharge roller and a switch back roller, the sequence space of two rollers will be needed, and also the mechanism for a drive of these will also be added. For this reason, although it is desirable to improvement in the speed by continuation delivery of a web material, there is a limit in the miniaturization of a device.

[0006]On the other hand, it is one effective means to make a discharge roller and a switch back roller serve a double purpose in the case where priority is given to a miniaturization. That is, the miniaturization of a device will be attained if discharge of a web material [finishing / double-sided printing] and switch back operation for reversal of the web material one side printed are considered as the composition which a discharge roller is made to bear.

[0007]However, in the period of the operation which switchbacks, the following web material is not continuously sendable what uses one roller also [of a web material / discharge and reversal] in this way. For this reason, the conveyance interval equivalent to one sheet of a web material is vacant, and printing speed is reduced.

[0008]Thus, conventionally, with composition, since it is necessary to form a switch back roller independently if it is going to accelerate double-sided printing speed, while the whole device is enlarged, if it is going to give priority to a miniaturization, printing speed will fall.

[0009]There is the issue which should be solved in this invention in providing the image forming device provided with the double-sided printing mechanism in which improvement in the speed and a miniaturization can be simultaneously realized by enabling both reversal of a web material, and discharge simultaneously with a single mechanism.

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MEANS

[Means for Solving the Problem]An image formation part which forms a picture in a web material as a recording medium.

An inverting means which reverses a transportation direction in order to convey again a web material conveyed from said image formation part in said image formation part.

An ejecting means which discharges said web material conveyed from said image formation part.

A carrying path which is the image forming device provided with the above, carries out nip of said web material, respectively, and constitutes said inverting means and said ejecting means from a roller group of a lot which can be conveyed, and leads said web material to said inverting means and said ejecting means was established independently, respectively.

[0011]Since reversal and discharge of a web material can be operated by a roller group of a lot according to this composition, an image forming device provided with a double-sided printing mechanism which realized improvement in the speed and a miniaturization simultaneously is obtained.

[0012]

[Embodiment of the Invention]The image formation part by which the invention according to claim 1 forms a picture in the web material as a recording medium, In the image forming device which has an inverting means which reverses a transportation direction in order to convey again the web material conveyed from said image formation part in said image formation part, and an ejecting means which discharges said web material conveyed from said image formation part, Carry out nip of said web material, respectively, and said inverting means and said ejecting means are constituted from a roller group of the lot which can be conveyed, And even if it is characterized by establishing independently the carrying path which draws said web material, respectively and does not equip said inverting means and said ejecting means with each mechanism the object for discharge, and for reversal, it has the operation that the inversion operation and discharging operation of a web material can be performed simultaneously.

[0013]The invention according to claim 2 said roller group which constitutes said inverting means and said ejecting means, It is the image forming device provided with the double-sided printing mechanism according to claim 1 considering it as reversal of said web material, and the roller of 3 stage arrangement which forms two nips of discharge, Reversal of a web material and delivery for discharge can be made to bear in the

combination of the roller of a minimum number, and it has the operation that device capacity can be made still smaller.

[0014]It is the image forming device provided with the double-sided printing mechanism according to claim 1 or 2, wherein the invention according to claim 3 is provided with the drive system which operates two or more rollers of said roller group with single drive mechanism by a mutual drive and follower relations, It has the operation of urging further the miniaturization of the device capacity by the roller group for drive mechanism, reversal, and discharge.

[0015]Hereafter, an embodiment of the invention is described using drawing 12 from drawing 1. Drawing 1 is an entire configuration figure of the image forming device provided with the double-sided printing mechanism in an embodiment of the invention.

[0016]An image forming device arranges four image formation station ("process unit" is called hereafter) Pa, Pb, Pc, and Pd as a main element. These process unit Pa-Pd forms the color picture of black, cyanogen, magenta, and yellow, respectively, and is provided with the photo conductor drums 1a, 1b, 1c, and 1d as image support. The electrifying means 2a of exclusive use [surroundings / of the photo conductor drums 1a-1d], 2b, 2c, 2d, The exposure means 3 for irradiating each photo conductor drums 1a-1d with the light according to picture information, the developing means 4a, 4b, 4c, and 4d, the transfer means 5a, 5b, 5c, and 5d, and the cleaning means 6a, 6b, 6c, and 6d are arranged, respectively. And to the photo conductor drums [1a-1d] down side, the endless intermediate transfer belt 7 which runs to the arrow direction in a figure and revolves each process unit Pa-Pd in order is arranged.

[0017]electrifying-means 2a In such composition, 1st process unit Pa reaches first, After forming the latent image of the black-components color of picture information on the photo conductor drum 1a by the exposure means 3, this latent image is visible-image-ized as a black toner image by the developing material which has black toner by the developing means 4a, and a black toner image is transferred by the intermediate transfer belt 7 by the transfer means 5a.

[0018]On the other hand, while the black toner image is transferred by the intermediate transfer belt 7, the latent image of a cyanogen ingredient color is formed by the 2nd process unit Pb, Then, the cyanogen toner image by a cyanogen toner is acquired by the developing means 4b, and a cyanogen toner image is transferred by the transfer means 5b of the 2nd process unit Pb by the intermediate transfer belt 7 which transfer ended by 1st previous process unit Pa, and is laid on top of it with a black toner image.

[0019]After image formation is hereafter performed in a similar way also about a magenta toner image and a yellow toner image and superposition of the toner image of four colors is completed to the intermediate transfer belt 7, Package transfer of the toner image of four colors is carried out by the transfer roller 11 on the web materials 9, such as paper supplied by the web-material feeding means 8 from the web-material supply tray 10, heat fixing is carried out by the fixing means 12, and a full color image is obtained on the web material 9. The web material to which it was fixed is discharged by the discharge inverting means 13 to the discharging tray 16.

[0020]Residual toner is removed by the cleaning means 6a-6d, and each photo conductor drum 1a-1d which transfer ended is prepared for the next image formation performed succeedingly.

[0021]When performing double-sided printing in this image forming device, the web material 9 switchbacks by the discharge inverting means 13, and is conveyed to the printed [one side] web-material carrying path

15-2. Then, it is transferred by the transfer roller 11 as the 2nd transfer means to another field, is again established by the fixing means 12, and is discharged by the discharge inverting means 13 to the discharging tray 16.

[0022]Drawing 2 is a figure showing the conveyance usual route of the web material in an embodiment of the invention. First, the web material 9 is conveyed from the web-material supply tray 10 to the web-material carrying path 15-1, and is transferred to one side by the transfer roller 11 which constitutes the 2nd transfer means. And it switchbacks, after being conveyed to the inverting means which comprises the driving roller 13-1 and the switch back roller 13-2, and it is returned to the printed [one side] web-material carrying path 15-2. Then, the web material 9 is again conveyed in the state where it turned over to the web-material carrying path 15-1, similarly is transferred by the transfer roller 11 to another field, is conveyed to the ejecting means which comprises the driving roller 13-1 and the discharge roller 13-3, and is discharged to the discharging tray 16.

[0023]Drawing 3 is a perspective view of the switch-back-operation part in the state before switch back operation, and drawing 4 is the side view. Drawing 5 is a perspective view of the switch-back-operation part in the state where switch back operation and discharging operation are performed simultaneously, and drawing 6 is the side view. Drawing 7 is a figure showing the interlocking relationship between each roller, and the figure in which drawing 8 (a) shows the branching device in the state where the branching device turned to the direction of an ejecting means, and its driving means, and (b) are the figures showing the branching device in the state where the branching device turned to the direction of an inverting means, and its driving means.

[0024]In a figure, an inverting means comprises the driving roller 13-1 and the switch back roller 13-2, and an ejecting means comprises the driving roller 13-1 and the discharge roller 13-3. As shown in drawing 7, the driving roller 13-1, the switch back roller 13-2, and the discharge roller 13-3 are connected to gear 17-1, 17-2 and 17-3, respectively. If the gear 17-1 is driven by a driving means, in order that gear 17-2, 17-3 may follow, respectively, the switch back roller 13-2 and the discharge roller 13-3 will follow to the driving roller 13-1. In the state where the branching device 14 has the structure of changing direction by operating the solenoid 18, and the solenoid 18 is not operated as shown in drawing 8. As shown in the figure (a), a branching device turns to the direction of an ejecting means, and where the solenoid 18 is operated, as shown in the figure (b), a branching device turns to the direction of an inverting means.

[0025]First, the web material 9-1 conveyed from the web-material carrying path 15-1 printed [one side] is led to an inverting means like drawing 3 and drawing 4 by the branching device 14 which operated the solenoid 18 and was turned to the inverting means side. Before the web material 9-1 printed [one side] passes ejection and an inverting means thoroughly from the branching device 14, it halts and an inverting means and an ejecting means begin counterrotation.

[0026]Furthermore, in drawing 5 and drawing 6, simultaneously with the counterrotation start of an inverting means and an ejecting means, if operation of the solenoid 18 is stopped, the branching device 14 will serve as the posture in which it turns to the ejecting means side. The double-sided printing finishing web material 9-2 is conveyed from the web-material carrying path 15-1 there, and it is discharged by the ejecting means on the discharging tray 16. Simultaneously, the web material 9-1 printed [one side] is conveyed to the printed [one side] web-material carrying path 15-2.

[0027]And if the double-sided printing finishing web material 9-2 slips out from an inverting means thoroughly from an ejecting means, respectively, the web material 9-1 printed [one side], An inverting means and an ejecting means begin positive rotation again, the solenoid 18 operates, it will be in the state of drawing 3 and drawing 4, and the web material 9-1 printed [one side] will serve as a flow conveyed to an inverting means.

[0028]Hereafter, it explains, using drawing 9 to drawing 12 as a flow of the whole web material. Drawing 9 to drawing 12 is a time sequence diagram in an embodiment of the invention.

[0029]First, it explains that web-material A flows. Web-material A of drawing 9 is inserted in the web-material carrying path 15-1 from the web-material supply tray 10. Next, it is turned to between the driving roller 13-1 and the switch back roller 13-2 by the branching device 14 like drawing 10, and enters like drawing 11 between the driving roller 13-1 and the switch back roller 13-2. Before passing through between the driving roller 13-1 and the switch back rollers 13-2 like drawing 12, the driving roller 13-1, the switch back roller 13-2, and the discharge roller 13-3 begin counterrotation. Simultaneously with it, the branching device 14 is turned to between the driving roller 13-1 and the discharge roller 13-3.

[0030]Next, web-material A is conveyed like web-material B among drawing 12 from drawing 9. Like drawing 9, after web-material B escapes from between the driving roller 13-1 and the switch back rollers 13-2 thoroughly, the branching device 14 is again turned to between the driving roller 13-1 and the switch back roller 13-2. Simultaneously with it, the driving roller 13-1 of drawing 10, the switch back roller 13-2, and the discharge roller 13-3 begin normal rotation. Furthermore, it is conveyed in order of B of drawing 11, and B of drawing 12, and will be in the state of C of drawing 9 the next. Here, it is turned to between the driving roller 13-1 and the discharge roller 13-3 by the branching device 14, and is discharged on the discharging tray 16 by the driving roller 13-1 and the discharge roller 13-3.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The entire configuration figure of the image forming device provided with the double-sided printing mechanism in an embodiment of the invention

[Drawing 2]The figure showing the conveyance usual route of the web material in an embodiment of the invention

[Drawing 3]The perspective view of the switch-back-operation part in the state before switch back operation

[Drawing 4]The side view of drawing 3

[Drawing 5]The perspective view of the switch-back-operation part in the state where switch back operation and discharging operation are performed simultaneously

[Drawing 6]The side view of drawing 5

[Drawing 7]The figure showing the interlocking relationship between each roller

[Drawing 8](a) The figure showing the branching device in the state where the branching device turned to the direction of an ejecting means, and its driving means
(b) is a figure showing the branching device in the state where the branching device turned to the direction of an inverting means, and its driving means.

[Drawing 9]The time sequence diagram in an embodiment of the invention

[Drawing 10]The time sequence diagram in an embodiment of the invention

[Drawing 11]The time sequence diagram in an embodiment of the invention

[Drawing 12]The time sequence diagram in an embodiment of the invention

[Description of Notations]

1a, 1b, 1c, and 1d Photo conductor drum

2a, 2b, and 2c and 2d Electrifying means

3 Exposure means

4a, 4b, 4c, and 4d Developing means

5a, 5b, 5c, and 5d Transfer means

6a, 6b, 6c, 6d cleaning means

7 Intermediate transfer belt

8 Web-material feeding means

9 Web material

9-1 The web material printed [one side]

9-2 Double-sided printing finishing web material

10 Web-material supply tray

11 Transfer roller

12 Fixing means

13 Discharge inverting means

13-1 Driving roller

13-2 Switch back roller

13-3 Discharge roller

14 Branching device

15-1 Web-material carrying path

15-2 Printed [one side] web-material carrying path

16 Discharging tray

17-1,17-2 and 17-3 Gear

18 Solenoid

[Translation done.]

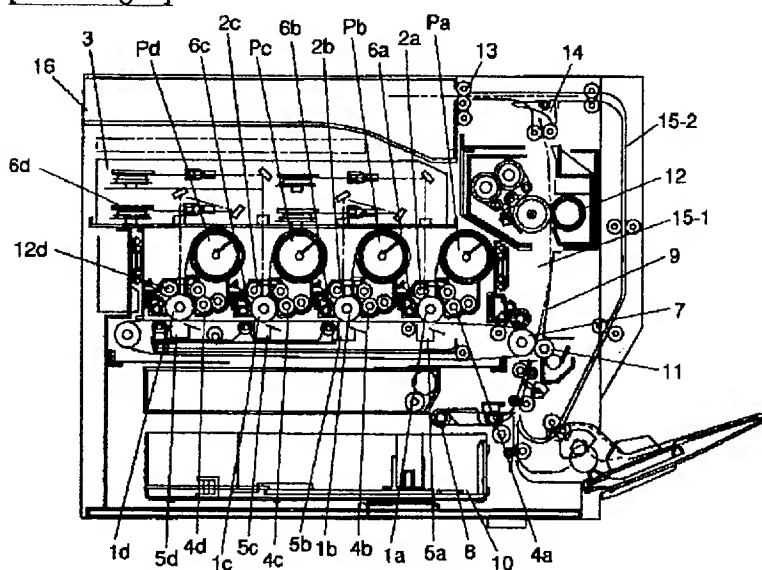
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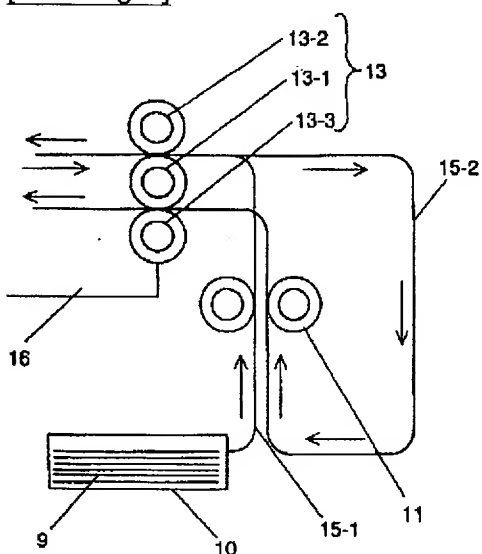
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DRAWINGS

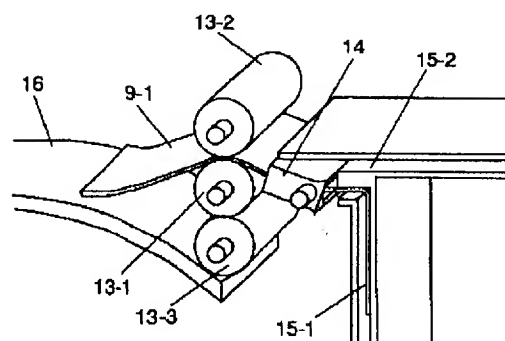
[Drawing 1]



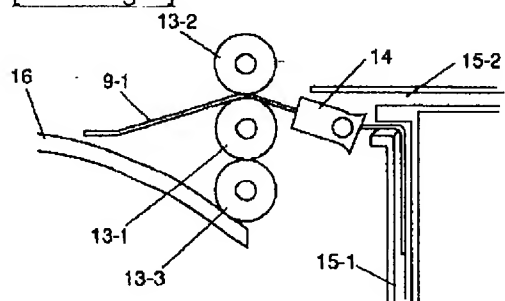
[Drawing 2]



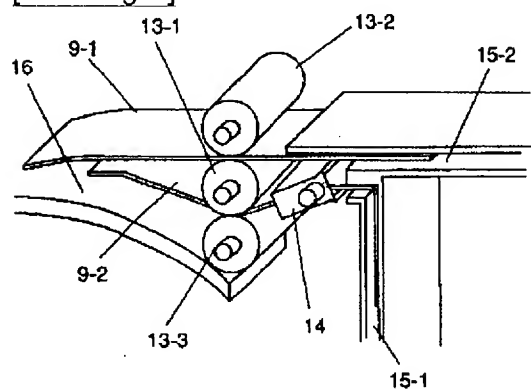
[Drawing 3]



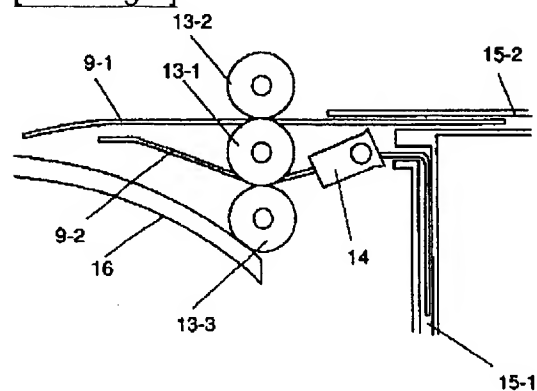
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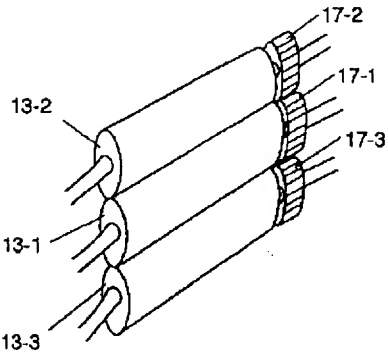
[Drawing 5]



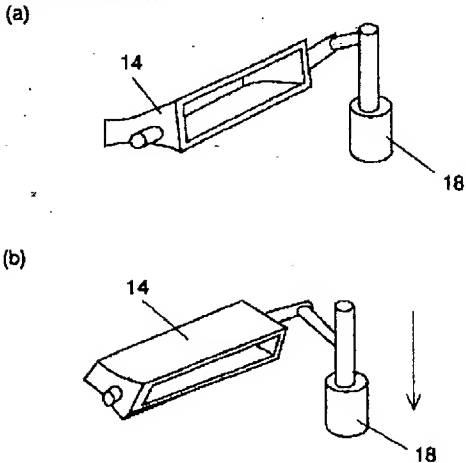
[Drawing 6]



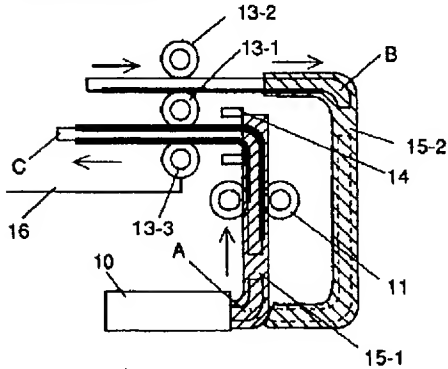
[Drawing 7]



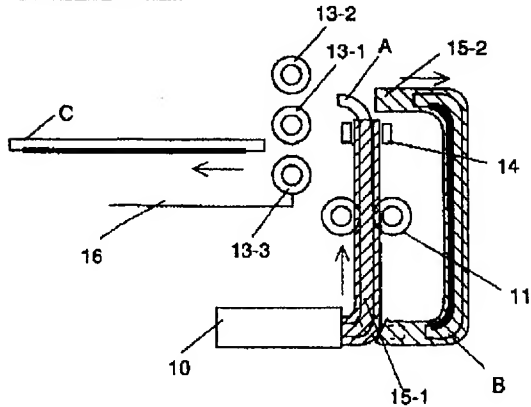
[Drawing 8]



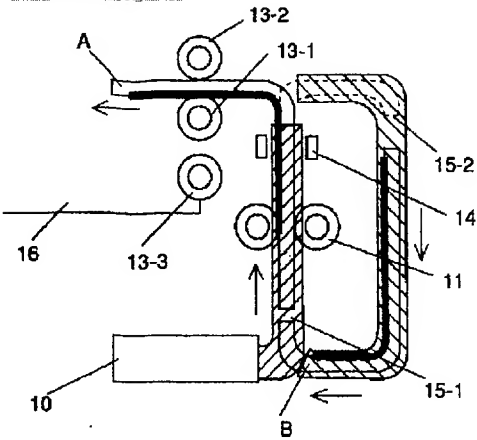
[Drawing 9]



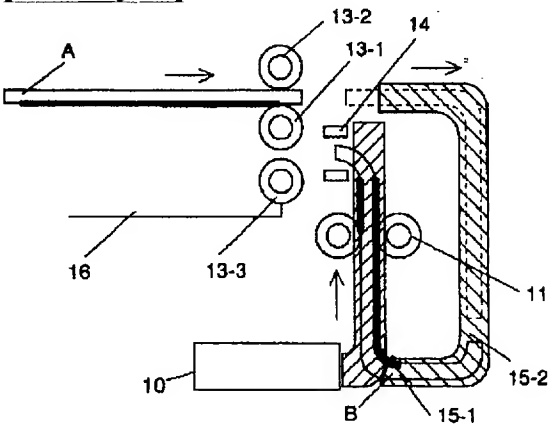
[Drawing 10]



[Drawing 11]



[Drawing 12]



[Translation done.]